V. & VI. In paragraph 7, Claims 1 and 4-9 have been rejected as either anticipated or unpatentable over U.S. Patent 5,677,121 (Tsuzuki).

VII. In paragraph 8, Claims 10 and 12 were rejected as unpatentable over Tsuzuki taken with Murray.

VIII. & IX. In paragraph 9, Claims 1 and 4-9 have been rejected as either anticipated by U.S. Patent 6,146,823 (Katoh) or unpatentable over Katoh.

X. In paragraph 10, Claims 10 and 12 have been rejected as unpatentable over Katoh taken with Murray.

Each of these rejections is traversed and will be discussed in turn after a brief description of the presently claimed invention.

Applicants' Invention:

Photothermographic materials are commercially available for use in the medical imaging industry, and are particularly used for diagnosis and archival of clinical images. One of the most important aspects of such photothermographic materials is their ability to record and communicate diagnostically significant image information.

Radiologists often characterize diagnostic capability of photothermographic imaging materials with terms like sharpness, clarity, resolution, contrast, graininess, and crispness. However, it has been found that image tone can play a significant role in how easily diagnostic information can be read from an image. Often, altering nothing but the tone of a photothermographic imaging material can enhance or reduce the apparent sharpness and clarity in the resulting image.

Tone can be defined as the color of the image with respect to all densities. Tint can be defined as the color of the image in the unexposed background areas (D_{min}).

Tinting dyes have been described in the art as a means for producing a material within a specific color space. However, the use of tinting dyes will increase the background density (D_{min}) in the unexposed portion of a film. The effectiveness of tinting dyes for adjusting color decreases as the density of an image increases. For example, the use of tinting dyes to get a moderate shift

in CIELAB a* and b* values at an image density of 1.0 produces a much larger shift in a* and b* values in the background density (Dmin). In many cases, the most preferable tone may not be achieved by use of tinting dyes. Imaging materials are needed in which tone can be adjusted without adversely affecting tint and Dmin.

Moreover, because tinting dyes and colorants affect the background tint more than tone at densities such as 1.0, methods are needed to achieve the desired image tone. These methods must achieve the best tone without adversely affecting background tint and Dmin.

The present invention is directed to an IR-sensitive photothermographic material having an image tone that is characterized as having a b* value, upon imaging and processing, at an optical density of 1.0 that is greater than the b* value at Dmin. In addition, the thermally developable imaging layer(s) of the photothermographic material have a total absorbance of at least 1 at an exposure wavelength. These photothermographic materials have the tone desired by the medical profession at the critical optical density between Dmin and 1.0. Such characteristics provide images that are observably sharper or clearer. It is not sufficient to have "colder" or "bluer" toned images for this to be true. Rather the relationship of b* and optical density was discovered to be critical to these desirable results.

Applicants would also like to call the Examiner's attention to the Examples in the present application. In Comparative Examples A through F, upon imaging and processing, the samples became bluer (that is, the value of b* became more negative) as the optical density increased from Dmin to 1.0. In contrast, in the Inventive Samples, upon imaging and processing, the samples became less blue (that is, value of b*became more positive) as the optical density increased from Dmin to 1.0. As noted on page 71, radiologists preferred the tone and tint observed in the Inventive Samples.

Response to Rejection I:

Applicants respectfully disagree that the rejected claims are not supported by a disclosure that meets the requirements of Section 112(1).

The Office Action says that the specification fails to provide support for the limitation "a photosensitive silver halide that is spectrally sensitized to the infrared region of the spectrum". This is incorrect.

Inventive Examples 1, 2, 3, and 4, and Comparative Examples D, E, and F are all spectrally sensitized by Sensitizing Dye A (pages 58 and 64, line 12). This dye is a well known infrared sensitizing dye. In the section on Spectral Sensitizers (page 23ff), Applicants have incorporated by reference U.S. Patent 5,541,054 (Miller et al.) that, in line 5, page 24, fully describes and exemplifies Sensitizing Dye A as an excellent infrared sensitizing dye (it is identified as Dye 1 in Column 10 of Miller et al.). Also, attention is directed to Column 4 (lines 34ff) where Miller et al. teaches that its invention is directed towards finding improved spectral sensitizing dyes to match exposure sources emitting in the wavelength range from 780 to 850 nm. The examples in Miller et al. (Columns 19-29) teach that Dye 1 (i.e. Applicants' Sensitizing Dye A) is an excellent sensitizing dye for samples that were exposed with a laser diode at 809 nm (Column 25, line 13), and that the samples were coated under infrared safelights (Column 24, line 53). Thus, this incorporated teaching clearly defines Sensitizing Dye A as an IR sensitizing dye.

In addition, Inventive Examples 1, 2, 3, and 4, and Comparative Examples D, E, and F in the present application were all imaged and thermally developed using a commercially available DryView® 8700 Laser Imager (page 68, line 10, page 72, line 18). The DryView® 8700 Laser Imager is well known in the industry to use an infrared laser diode as its exposure source. The Examiner's attention is directed to a description of this commercially available imaging apparatus on the internet at:

< www.kodak.com/eknec/documents/af/0900688a800562af/J-700Eng.pdf >.

This web publication (hard copy enclosed) states, under the heading "How Kodak DryView Laser Imagers Work", that "an infrared laser diode exposes the film, and it (the film) is fed into the processor." Likewise, Comparative Example A of the present application is DryView Laser Imaging Film, well known in the industry as an infrared sensitized photothermographic film.

Finally, Applicants believe that one skilled in the art of spectral sensitization of photothermographic materials would know that tricarbocyanine dyes having benzothiazole groups at each end and a 7-carbon chain having 4

alternating double bonds (such as Sensitizing Dye A) absorb in the infrared. This class of dyes is well-known and is described in, for example, F. M. Hamer, *Cyanine Dyes and Related Compounds*, John Wiley & Sons, New York, 1964, Chapter VIII, pp. 244-269. TABLE I on page 268 specifically lists benzothiazole tricarbocyanine (Y=Z=S) as having an absorption maximum in the infrared at 765 nm. A copy of pages 244, 252, and 268 is enclosed for the Examiner's convenience.

Therefore, the limitation of the present claims for "a photosensitive silver halide that is spectrally sensitized to the infrared region of the spectrum" is fully supported in the specification by incorporated teaching as well as all of the inventive examples. Applicants therefore request that the Section 112(1) rejection be withdrawn.

Response to Rejection II:

The Office Action alleges that Claims 1, 4-9 and 11 are anticipated by Toya. The Office Action alleges that Toya teaches antihalation dye I-1 and spectral sensitizing dye 1, and an exposure wavelength of 780 nm that is within the infrared region. However, the Office Action admits that Toya does not state a value for b* after processing the film, but alleges that it would be inherent in the material taught in the patent because of the similarity of compositions. The total absorbance of at least 1.0 at the exposure wavelength is said to be small enough to be inherent in the materials of Toya (Col. 16, Dye I-1 coated within an amount of 10 mg/m^2). The Office Action then argues that in the absence of a showing otherwise, the claimed invention is anticipated.

Applicants respectfully disagree. Applicants specifically recite in Claim 1: "wherein said one or more thermally developable imaging layers have a total absorbance of at least 1.0 at an exposure wavelength".

Dye I-1, cited in Toya, is not in an imaging layer. Rather it is in Layer A of the element that is not an imaging layer. Moreover, Dye I-1 is incorporated into Layer A as a dispersion of microcrystalline dye (Column 9, line 63). It is not dissolved in solution. Thus, Dye I-1 cannot diffuse into the adjacent imaging layer (Layer B) during coating. Therefore, there is no significant absorbance incorporated into the imaging layers in Toya. This alone renders Toya

as lacking disclosure to anticipate Applicants' claimed invention and the anticipation rejection should be withdrawn.

Response to Rejection III:

Applicants also traverse the unpatentability rejection over Toya. As pointed out above, Dye I-1 in Toya is located outside of the imaging layers, and is not an infrared dye. There is no suggestion or reason in Toya to change its location. The presently claimed invention requires the imaging layers to have the required total absorbance and to have the desired tone at the densities used in the medical field. This is not appreciated in Toya.

In addition, the spectral sensitizing dye present in the imaging layer of Toya is present at far too small an amount to provide any significant absorbance as well. As described in Col 16, lines 44-55, the amount of spectral sensitizing dye incorporated into the imaging layer was $2x10^{-7}$ mol/m^2, or less than 0.1 mg/m^2. This is well below the amount required to provide an absorbance of at least 1.0 at an exposure wavelength. The Examiner is asked to consider the data provided below with respect to Rejection V showing that an infrared sensitizing dye used at much higher coating weight still does not provide an absorbance of at least 1.0 at an exposure wavelength.

Moreover, there is no technical basis for the Examiner's speculation that the required b* value required for the presently claimed invention is inherent in the materials of Toya. The imaging composition used in the Toya materials is no closer to the presently claimed invention than to the Comparative Examples A, B, and C materials described in Applicants' application that have been shown to be outside of Applicants' requirements and to fail at solving the tone problem.

Response to Rejection IV:

Method Claims 10 and 12 have been rejected over the combination of Toya, Murray, and Manian. While Applicants disagree on the merits because neither Murray nor Manian, individually or collectively, overcomes deficiencies pointed out for Toya, they are not relying on the features of Claims 10 and 12 for patentability. Those claims are dependent on otherwise novel and patentable subject matter and thus the rejection is without merit for the same reasons stated above in response to Rejection III.

Response to Rejection V:

Paragraph 7 of the Office Action alleges that Claims 1, 4-9 are anticipated by Tsuzuki. In paragraph 7 of the Office Action, it appears that the Examiner has confused Toya with Tsuzuki. Applicants' arguments against Toya are not repeated here but the Examiner's attention is again directed to Applicants' responses to Rejections II and III.

With respect to Tsuzuki, Applicants respectfully disagree with the rejection of Claims 1 and 4-9 as being anticipated by Tsuzuki. Applicants specifically claim materials "wherein said one or more thermally developable imaging layers have a total absorbance of at least 1.0 at an exposure wavelength". Dyes 1 through 5 described in Tsuzuki are used therein as spectral sensitizing dyes, which are of course, at levels far too small to provide any significant absorbance (see Col. 19-20 for the amount of less than 10 mg/m^2 for an upper limit by conventional calculations; the formulation has some ambiguity, but that is the highest level possible) and certainly not Applicants' required absorption of at least 1.0 at an exposure wavelength. To confirm this, Applicants coated Dye 1 (shown in column 20 of Tsuzuki) at a coating weight of 10 mg/m^2 and obtained a peak absorbance of less than 0.1 at 780 nm. This is far below the Applicants' required absorption of at least 1.0 at the exposure wavelength. In Example 2 (column 22, lines 45-47), Tsuzuki uses infrared sensitizing Dyes 2 to 5 at the same molar ratio as that used for Dye 1. This too would result in an absorption far below the Applicants' required absorption of at least 1.0 at the exposure wavelength. See the enclosed **Rule 132 Declaration** by Bryan Hunt.

Tsuzuki uses Compound B for antihalation. It is located in a layer on the backside (non-imaging side) of the support. This dye provides an absorbance of 1.2 at 810 nm, but only on the backside and thus this teaching is irrelevant to Applicants' claimed invention. There is no significant component incorporated into the imaging layers in Tsuzuki to provide the absorbance required in the presently claimed invention. Thus, Tsuzuki lacks the disclosure to anticipate Applicants' claimed invention and the anticipation rejection should be withdrawn.

Response to Rejection VI:

Applicants also disagree with the rejection of Claims 1 and 4-9 as unpatentable over Tsuzuki. The Office Action argues that the materials of Tsuzuki inherently have Applicants' required tone (b*) value and absorbance even though neither feature is specifically disclosed. Again, this is a speculative position stated in the Office Action without any technical reasoning or proof. The imaging compositions used in the materials described in Tsuzuki are no closer to Applicants' claimed materials than to the Comparative Examples A, B, and C materials described in Applicants' application that have been shown to be outside of Applicants' requirements and to fail at solving the tone problem.

As noted above, Applicants specifically claim materials "wherein said one or more thermally developable imaging layers have a total absorbance of at least 1.0 at an exposure wavelength". The sensitizing dyes in Tsuzuki that are within the thermally developable layers are present at too small an amount to provide the necessary absorbance, and the antihalation materials are located in a non-imaging layer on the backside of the support. There is no reason or suggestion given in Tsuzuki that changing the location of the dyestuff would be beneficial, as Applicants have unexpectedly found. Thus, Tsuzuki is irrelevant to the presently claimed invention and this rejection should be withdrawn.

Response to Rejection VII:

Method Claims 10 and 12 have been rejected over the combination of Tsuzuki, Murray, and Manian. While Applicants disagree on the merits because neither Murray nor Manian, individually or collectively, overcomes deficiencies pointed out for Tsuzuki, they are not relying on the features of Claims 10 and 12 for patentability. Those claims are dependent on otherwise novel and patentable subject matter and thus the rejection is without merit for the same reasons stated above in response to Rejection VI.

Response to Rejection VIII:

The Office Action alleges that Claims 1, 4-9 and 11 are anticipated by Katoh. Applicants respectfully disagree. Applicants specifically recite in Claim 1: "wherein said one or more thermally developable imaging layers have a total absorbance of at least 1.0 at an exposure wavelength".

Katoh's disclosure in Column 16 (lines 1-14) does not describe the incorporation of a dyestuff into an imaging layer. While a dyestuff is added to the film to provide an absorbance of preferably at least 0.8 at an exposure wavelength, it is added to a dyestuff layer (that is, an antihalation layer, Col. 15, lines 66-67) that is disposed on the same side of the support as the photosensitive layer (i.e., imaging layer) or on the opposite side (backside) of the support. Here the dyestuff is not added to the imaging layer itself, and therefore does not add absorbance to the imaging layer. There is no suggestion of compounds incorporated into the imaging layers in Katoh to provide the required absorbance of at least 1.0 at the exposure wavelength. For example, it is to be noted that Katoh mentions (Example 1) the presence of Dye A in the emulsion layer on the frontside of the support in a photothermographic material. Applicants do not believe that the presence of this dye, either in solution or as a dispersion, provides the absorbance called for in the presently claimed invention. This alone renders Katoh as lacking disclosure to anticipate Applicants' claimed invention and the anticipation rejection should be withdrawn.

Response to Rejection IX:

Applicants also disagree with the rejection of Claims 1 and 4-9 as unpatentable over Katoh because the Office Action argues that the materials of Katoh inherently have Applicants' required tone (b*) value and absorbance even though neither feature is specifically disclosed. Again, this is a speculative position given in the Office Action without any technical reasoning or proof. The compositions used in the materials described in Katoh are no closer to Applicants' claimed materials than to the Comparative Examples A, B, and C materials described in Applicants' application that have been shown to be outside of Applicants' requirements and to fail at solving the tone problem.

As noted above, Applicants specifically claim materials "wherein said one or more thermally developable imaging layers have a total absorbance of at least 1.0 at an exposure wavelength". Katoh's disclosure in Column 16 (lines 1-14) teaches the incorporation of a dyestuff into a layer other than an imaging layer and therefore does not teach the required absorbance of at least 1.0 in the imaging layer. There is no reason or suggestion given in Katoh that changing the location of the dyestuff would be beneficial, as Applicants have unexpectedly

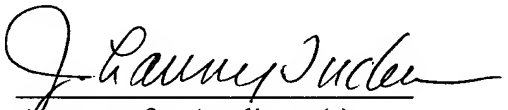
found. Thus, Katoh is irrelevant to the presently claimed invention and this rejection should be withdrawn.

Response to Rejection X:

Method Claims 10 and 12 have been rejected over the combination of Katoh, Murray, and Manian. While Applicants disagree on the merits because neither Murray nor Manian, individually or collectively, overcomes deficiencies pointed out for Katoh, they are not relying on the features of Claims 10 and 12 for patentability. Those claims are dependent on otherwise novel and patentable subject matter and thus the rejection is without merit for the same reasons stated above in response to Rejection IX.

In view of the foregoing amendments and remarks, reconsideration of this patent application is respectfully requested. A prompt and favorable action by the examiner is earnestly solicited.

Respectfully submitted,



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If the Examiner is unable to reach the Applicant(s) Attorney at the telephone number provided, the Examiner is requested to communicate with Eastman Kodak Company Patent Operations at (585) 477-4656.